

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A fluid sensor on a substrate for use in an environment having an ambient temperature, the fluid sensor comprising:

a) a field-effect transistor (FET) disposed on the substrate comprising a functionalized semiconductor nano-wire, the functionalized semiconductor nano-wire including at least one catalyst, the catalyst comprising a material capable of interacting with a fluid to be sensed and effecting a change of an electrical characteristic of the FET,

b) a control device on the substrate comprising a non-functionalized semiconductor nano-wire otherwise identical to the FET,

[[b]]c) an integral heater disposed proximate to the field-effect transistor to heat the field-effect transistor to an elevated temperature relative to the ambient temperature,

d) an integral temperature sensor on the substrate configured to allow control and selection of temperatures for at least one of calibration and setting of gas sensitivity;
and

[[c]]e) integral thermal insulation disposed on the substrate to maintain the field-effect transistor at the elevated temperature wherein selection of the FET operating temperature by measurement of the integral temperature sensor, a particular fluid may be detected.

2. (Original) The fluid sensor of claim 1, wherein the functionalized semiconductor nano-wire comprises silicon.

3. (Previously Presented) The fluid sensor of claim 1, wherein the functionalized semiconductor nano-wire is doped to provide a predetermined conductivity type.

Claims 4-5 (Cancelled).

6. (Previously Presented) The fluid sensor of claim 1, wherein the catalyst comprises a metallic catalyst.

7. (Previously Presented) The fluid sensor of claim 1, wherein the catalyst is a material selected from the list consisting of platinum, palladium, iridium, rhenium, ruthenium, gold, silver, and mixtures or alloys or compounds thereof; carbon; tungsten, titanium, tin, zinc, and oxides thereof; organometallic compounds containing elements from the group consisting of cobalt, iron, and nickel; and transition metal complexes containing elements from Groups IIIA, IVA, VA, VIA, VIIA, VIIIA, IB, IIB of the Periodic Table of Elements.

8. (Previously Presented) The fluid sensor of claim 1, wherein the catalyst comprises a porous thin layer of catalyst material.

9. (Original) The fluid sensor of claim 8, wherein pores of the porous thin layer of catalyst material extend at least partially through the thin layer of catalyst material.

10. (Previously Presented) The fluid sensor of claim 1, wherein the catalyst comprises a mesh formed by thin filaments of catalyst material.

Claims 11-12 (Cancelled).

13. (Cancelled).

14. (Currently Amended) The fluid sensor of claim ~~[[13]]~~1, wherein the field-effect transistor and the substrate are formed from a layer of silicon on an insulator (SOI).

15. (Original) The fluid sensor of claim 14, wherein the field-effect transistor and the substrate are formed from a layer of silicon on an insulator layer comprising silicon oxide.

16. (Cancelled).

17. (Currently Amended) The fluid sensor of claim ~~[[13]]~~1, wherein the integral heater is disposed on the substrate.

18. (Currently Amended) The fluid sensor of claim ~~[[13]]~~1, wherein the integral heater is disposed on the integral thermal insulation.

19. (Cancelled).

20. (Currently Amended) The fluid sensor of claim [[13]]1, wherein the field-effect transistor (FET) is disposed on the integral thermal insulation.

21. (Currently Amended) The fluid sensor of claim [[13]]1, wherein a portion of the substrate is removed to form an opening under the field-effect transistor (FET), the opening being at least partially aligned with the field-effect transistor.

22. (Currently Amended) The fluid sensor of claim [[13]]1, wherein the substrate serves as a gate for the field-effect transistor.

23. (Currently Amended) The fluid sensor of claim [[13]]1, wherein the field-effect transistor includes a gate electrically insulated from the substrate.

24. (Currently Amended) The fluid sensor of claim [[13]]1, wherein the functionalized semiconductor nano-wire comprises a conductive catalyst electrically insulated from the substrate to provide a gate for the field-effect transistor.

Claims 25 - 26. (Cancelled).

27. (Original) A fluid-sensor array, each fluid sensor of the fluid-sensor array comprising the fluid sensor of claim 1.

28. (Cancelled).

29. (Original) The fluid-sensor array of claim 27, wherein the field-effect transistor of each fluid sensor of the array is functionalized for detecting a particular substance.

30. (Original) The fluid-sensor array of claim 27, wherein the field-effect transistor of each fluid sensor of the array is functionalized for detecting a distinct substance.

31. (Original) The fluid-sensor array of claim 27, wherein the field-effect transistors of a number of the fluid sensors of the array are functionalized for detecting the same substance.

Claims 32-55 (Cancelled).

56. (Currently Amended) A fluid sensor on a substrate for use in an environment having an ambient temperature, the fluid sensor comprising:

a) a field-effect transistor (FET) comprising a functionalized semiconductor nano-wire, the functionalized semiconductor nano-wire including at least one coating, the coating including a substance capable of interacting with a fluid to be sensed and effecting a change of an electrical characteristic of the FET,

b) a control device on the substrate comprising a non-functionalized semiconductor nano-wire otherwise identical to the FET,

[[b]]c) an integral heater disposed proximate to the field-effect transistor to heat the field-effect transistor to an elevated temperature relative to the ambient temperature,

d) an integral temperature sensor configured to allow control and selection of temperatures for at least one of calibration and setting of gas sensitivity; and

[[c]]e) integral thermal insulation disposed on the substrate to maintain the field-effect transistor at the elevated temperature, wherein selection of the FET operating temperature by measurement of the integral temperature sensor, a particular fluid may be detected.

57. (Previously Presented) The fluid sensor of claim 56, wherein the coating comprised at least one dielectric layer of an oxide or a nitride that can be protonated or deprotonated for the detection of protons.

58. (Previously Presented) The fluid sensor of claim 56, wherein the coating comprises at least one organic species selected from the list consisting of antibodies, antigens, polymers, polynucleic acids, polypeptides, nanoparticles, ion exchange membranes, and combinations thereof.

59. (Previously Presented) The fluid sensor of claim 56, wherein the coating comprises at least one substance selected from the list consisting of thiols, amines, silanols, alcohols, sugars, Lewis acids, Lewis bases, dipoles, nucleic acids, peptides, and combinations thereof.